

Claims

[c1] 1. A robotic data storage library for operation with at least one data storage element and with the ability to reduce the transition time to reach an operational state after a transition of the library from a power-off state to a power-on state, the robotic data storage library comprising:

a plurality of storage locations, each capable of holding at least one data storage element;

a data transfer interface for receiving a data storage element and establishing a communication path with a data storage element so that data can be transferred between the data storage element and a host computer;

a transport unit for moving a data storage element between one of said plurality of storage locations and said data transfer interface;

a nonvolatile memory for storing an inventory of locations of the robotic data storage library; and

a controller for causing an audit to be performed to create an inventory, causing said inventory to be stored in said nonvolatile memory prior to a transition of the robotic data storage library from a power-off state to a power-on state, and causing said inventory to be trans-

mitted to a host computer after said transition of the robotic data storage library from a power-off state to a power-on state.

- [c2] 2. A library, as claimed in claim 1, wherein:
 - said plurality of storage locations comprises a location capable of holding a magazine;
 - said transport unit is adapted to move a magazine to and from said location; and
 - said controller is adapted to create an inventory comprising locations capable of holding a magazine.
- [c3] 3. A library, as claimed in claim 2, wherein said controller is adapted to create an inventory comprising said inventory of locations capable of holding a magazine and an inventory of locations capable of holding a data storage element.
- [c4] 4. A library, as claimed in claim 1, wherein:
 - said data transfer interface comprises a port for receiving a drive pack and establishing a communication path with a drive pack so that data can be transferred between the drive pack and a host computer;
 - said plurality of storage locations comprises a location capable of holding a drive pack;
 - said transport unit is adapted to move a drive pack between said location and said port; and

said controller is adapted to create an inventory comprising an inventory of locations capable of holding a drive pack.

[c5] 5. A library, as claimed in claim 1, wherein:

 said data transfer interface comprises a port for receiving a drive and establishing a communication path with a drive so that data can be transferred between the drive and a host computer;

 said plurality of storage locations comprises a location capable of holding a drive;

 said transport unit is adapted to move a drive between said location and said port; and

 said controller is adapted to create an inventory comprising an inventory of locations capable of holding a drive.

[c6] 6. A library, as claimed in claim 1, wherein:

 said data transfer interface comprises a drive for receiving a cartridge and establishing a communication path with a cartridge so that data can be transferred between the cartridge and a host computer;

 said plurality of storage locations comprises a location capable of holding a cartridge;

 said transport unit is adapted to move a cartridge between said location and said drive; and

 said controller is adapted to create an inventory of loca-

tions capable of holding a cartridge.

[c7] 7. A robotic data storage library for operation with at least one data storage element and with the ability to reduce the transition time to reach an operational state after a transition of the library from a power-off state to a power-on state, the robotic data storage library comprising:

- a plurality of storage locations, each capable of holding at least one data storage element;
- a data transfer interface for receiving a data storage element and establishing a communication path with a data storage element so that data can be transferred between the data storage element and a host computer;
- a transport unit for moving a data storage element between one of said plurality of storage locations and said data transfer interface;
- a nonvolatile memory for storing an inventory of locations of the robotic data storage library;
- a means for causing an audit to be performed to create an inventory, causing said inventory to be stored in said nonvolatile memory prior to a transition of the robotic data storage library from a power-off state to a power-on state, and causing said inventory to be transmitted to the host computer after said transition of the robotic data storage library from a power-off state to a power-

on state.

- [c8] 8. A library, as claimed in claim 7, wherein:
 - said plurality of storage locations comprises a location capable of holding a magazine;
 - said transport unit is adapted to move a magazine to and from said location; and
 - said means for causing an audit to be performed to create an inventory comprises means for creating an inventory of locations capable of holding a magazine.
- [c9] 9. A library, as claimed in claim 8, wherein:
 - said means for causing an audit to be performed to create an inventory comprises means for creating an inventory of locations capable of holding a magazine and an inventory of locations capable of holding a data storage element.
- [c10] 10. A library, as claimed in claim 7, wherein:
 - said data transfer interface comprises a port for receiving a drive pack and establishing a communication path with a drive pack so that data can be transferred between the drive pack and a host computer;
 - said plurality of storage locations comprises a location capable of holding a drive pack;
 - said transport unit is adapted to move a drive pack between said location and said port; and

said means for causing an audit to be performed to create an inventory comprises means for creating an inventory of locations capable of holding a drive pack.

[c11] 11. A method for reducing the transition time required to reach an operational state of a robotic data storage library after a transition of the library from a power-off state to a power-on state, the method comprising:

providing a robotic data storage library comprising:

a plurality of storage locations, each capable of holding at least one data storage element,

a data transfer interface for receiving a data storage element and establishing a communication path with a data storage element so that data can be transferred between the data storage element and a host computer, and

a transport unit for moving a data storage element between one of said plurality of storage locations and said data transfer interface;

auditing said robotic data storage library to create an inventory of locations of said robotic data storage library;

storing said inventory in a nonvolatile memory prior to a transition of said robotic data storage library from a power-off state to a power-on state;

transitioning said robotic data storage library from a power-off state to a power-on state;

making, following said step of transitioning, a determi-

nation about the reliability of the inventory stored in the nonvolatile memory; transmitting, following said step of transitioning and based upon said determination comprising an indication of reliability of said inventory, said inventory to the host computer.

- [c12] 12. A method, as claimed in claim 11, wherein said step of making a determination comprises querying an operator.
- [c13] 13. A method, as claimed in claim 12, wherein, if a result of said step of querying comprises an indication of reliability of said inventory, said step of transmitting said inventory is performed following said step of querying.
- [c14] 14. A method, as claimed in claim 12, wherein, if a result of said step of querying comprises an indication of unreliability of said inventory, transmitting said inventory to the host computer and performing a background audit of said robotic data storage library.
- [c15] 15. A method, as claimed in claim 12, wherein, if a result of said step of querying comprises an indication of unreliability of said inventory, performing an off-line audit of said robotic data storage library.
- [c16] 16. A method, as claimed in claim 11, wherein said step

of making a determination comprises checking a status of a sensor.

- [c17] 17. A method, as claimed in claim 16, wherein, if said status of said sensor comprises an indication of reliability of said inventory, said step of transmitting said inventory is performed following said step of checking said sensor.
- [c18] 18. A method, as claimed in claim 16, wherein, if said status of said sensor comprises an indication of unreliability of said inventory, transmitting said inventory to the host computer and performing a background audit of said robotic data storage library.
- [c19] 19. A method, as claimed in claim 16, wherein, if said status of said sensor comprises an indication of unreliability of said inventory, performing an off-line audit to provide an updated inventory.
- [c20] 20. A method, as claimed in claim 21, wherein said step of making a determination comprises performing a partial audit.
- [c21] 21. A method, as claimed in claim 20, wherein, if a result of said partial audit comprises an indication of reliability of said inventory, said step of transmitting said inventory is performed following said step of performing a partial

audit.

- [c22] 22. A method, as claimed in claim 20, wherein, if a result of said partial audit comprises an indication of unreliability of said inventory, transmitting said inventory to the host computer and performing a background audit of said robotic data storage library.
- [c23] 23. A method, as claimed in claim 20, wherein, if a result of said partial audit comprises an indication of unreliability of said inventory, performing an off-line audit of said robotic data storage library.
- [c24] 24. A method, as claimed in claim 20, wherein:
 - said plurality of storage locations comprises a location capable of holding a magazine;
 - said transport unit is adapted to move a magazine to and from said location; and
 - said partial audit comprises a magazine audit.
- [c25] 25. A method, as claimed in claim 24, wherein, if a result of said magazine audit comprises an indication of unreliability of said inventory:
 - performing a full media audit of said robotic data storage library;
 - updating said inventory to provide an updated inventory based upon said full media audit; and

transmitting said updated inventory to the host computer.

- [c26] 26. A method, as claimed in claim 24, wherein, if a result of said magazine audit comprises an indication of unreliability of said inventory:
 - performing a mismatch audit of said robotic data storage library;
 - updating said inventory based upon said mismatch audit to provide an updated inventory; and
 - transmitting said updated inventory to the host computer.
- [c27] 27. A method, as claimed in claim 24, wherein if a result of said magazine audit comprises an indication of unreliability of said inventory:
 - performing a mismatch audit of said robotic data storage library;
 - updating said inventory based upon said mismatch audit to provide an updated inventory;
 - transmitting said updated inventory to the host computer; and
 - performing a background audit of said robotic data storage library.
- [c28] 28. A method, as claimed in claim 24, wherein if a result of said magazine audit comprises an indication of unre-

liability of said inventory;
querying an operator whether to perform a full media audit or a mismatch audit of said robotic data storage library;
if a result of said step of querying comprises an indication for a full media audit, performing a full media audit and updating said inventory based upon said full media audit to provide an updated inventory;
if said result of said step of querying comprises an indication for a mismatch audit, performing a mismatch audit and updating said inventory based upon said mismatch audit to provide an updated inventory; and
transmitting said updated inventory to the host computer.

- [c29] 29. A method, as claimed in claim 11, wherein, following said transport unit moving a data storage element, updating said inventory in said nonvolatile memory.
- [c30] 30. A method, as claimed in claim 11, wherein said inventory comprises an inventory of locations of said robotic data storage library capable of holding a data storage element.
- [c31] 31. A method, as claimed in claim 11, wherein said inventory comprises an inventory of locations of said robotic data storage library capable of receiving said

data transfer interface.

- [c32] 32. A method, as claimed in claim 11, wherein said inventory comprises an inventory of locations capable of said robotic data storage library of receiving said transport unit.
- [c33] 33. A method for reducing the transition time required to reach an operational state of a robotic data storage library after a transition of the library from a power-off state to a power-on state, the method comprising:
 - providing a robotic data storage library comprising:
 - a plurality of storage locations, each capable of holding at least one data storage element,
 - a data transfer interface for receiving a data storage element and establishing a communication path with a data storage element so that data can be transferred between the data storage element and a host computer, and
 - a transport unit for moving a data storage element between one of said plurality of storage locations and said data transfer interface;
 - auditing said robotic data storage library to create an inventory of locations of said robotic data storage library;
 - storing said inventory of said robotic data storage library in a nonvolatile memory prior to a transition from a power-off state to a power-on state;
 - transitioning said robotic data storage library from a

power-off state to a power-on state;
transmitting, following said step of transitioning, said
inventory to the host computer.

- [c34] 34. A method, as claimed in claim 33, wherein, following said step of transitioning, monitoring operation of said robotic data storage library and said inventory for an error in said inventory, and, if an error is found, performing an audit.
- [c35] 35. A method, as claimed in claim 34, wherein said step of performing an audit comprises performing a background audit to update said inventory.
- [c36] 36. A method, as claimed in claim 34, wherein said step of performing an audit comprises performing an off-line audit to update said inventory.
- [c37] 37. A method, as claimed in claim 33, wherein, following said transport unit moving a data storage element, updating said inventory in said nonvolatile memory.
- [c38] 38. A method for reducing the transition time required to reach an operational state of a robotic data storage library after a transition of the library from a power-off state to a power-on state, the method comprising:
providing a robotic data storage library comprising:
a plurality of storage locations, each capable of holding

at least one data storage element,
a data transfer interface for receiving a data storage element and establishing a communication path with a data storage element so that data can be transferred between the data storage element and a host computer, and
a transport unit for moving a data storage element between one of said plurality of storage locations and said data transfer interface;
auditing said robotic data storage library to create an inventory of locations of said robotic data storage library;
storing said inventory of said robotic data storage library in a nonvolatile memory prior to a transition from a power-off state to a power-on state;
transitioning said robotic data storage library from a power-off state to a power-on state;
transmitting, following said step of transitioning, said inventory to the host computer; and
performing, following said step of transitioning, a background audit of said robotic data storage library.

[c39] 39. A method, as claimed in claim 38, wherein, following said transport unit moving a data storage element, updating said inventory in said nonvolatile memory.